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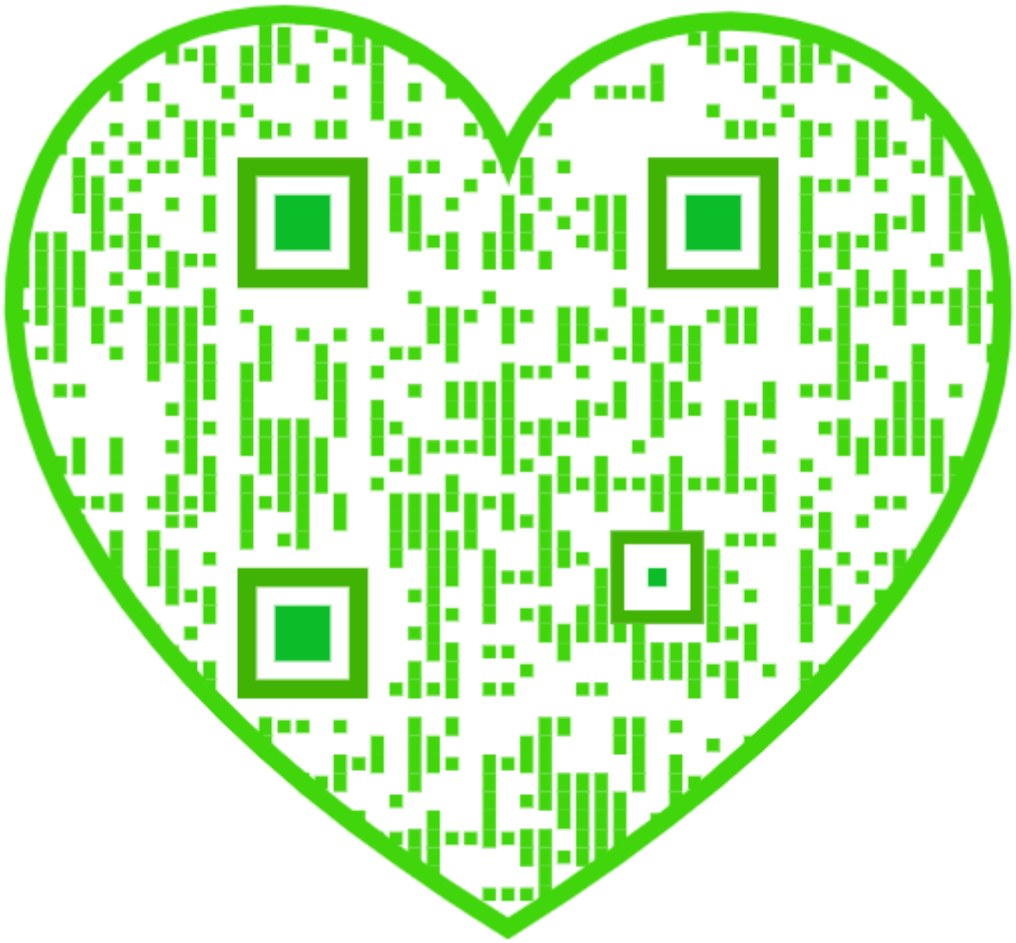

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The Hog and Hog Cholera

By Fifteen Specialists...

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The Hog and Hog Cholera.

By Fifteen Specialists.

Forty to fifty million head of swine are annually produced in the United States, at an average valuation of about $200,000,000 per year. This industry, therefore, ranks among the most important. Late years the diseases known as swine plague and hog cholera have destroyed about one hog out of five in the United States, thereby making inroads into the profits of farmers to the extent of about $50,000,000. How to check or prevent the disease and save this loss has been the subject of investigation and experimentation by the United States Bureau of Animal Industry and at our several agricultural colleges and among intelligent farmers for many years. Further than analyzing the symptoms of the disease and discovering the nature and habits of the germs that produce it, but little progress has been made, however.

The hope of being able to contribute something to assist the farmers in arresting the ravages of this disease, while at the same time furnishing the latest and best information on the subject of hog raising, is the motive which inspired the National Rural to gather together and publish the data contained in this little treatise. If it shall be found useful to the agricultural community, the editor will feel well repaid for his labor.

With best wishes for the prosperity of its many readers, we remain, Yours very truly,

Jas. W. Wilson,
Editor and Manager, The National Rural,
Chicago, Ill.

HOG CHOLERA.

THE NATIONAL RURAL'S SIMPLE PREVENTIVE AND REMEDY.

PRACTICAL farmers and specialists who have contributed to the body of this pamphlet have given full information in regard to the sanitary conditions which are absolutely necessary both for the prevention and cure of hog cholera.

We have found in our experience with the diseases of human kind that the best medium for the spread of disease is filth. What is true of mankind is equally true of animal life. We are of like flesh and blood. If we were compelled to take our food from filthy receptacles, contaminated with the germs of fermentation and decay, and drink water mixed with the filth of our own excrement and that of others, we would consider it a miracle indeed if disease and death did not quickly follow. Yet this is the way many farmers treat their hogs. Is it any wonder that under such circumstances hog cholera and the swine plague are prevalent?

Treat the hogs as enlightened people treat themselves; give them good, clean, dry beds to sleep in, their food in clean receptacles, and pure water to drink drawn from deep wells or fountains uncontaminated with the seepage from their own pens or barnyard; in other words, such water as we drink ourselves, and there will be little trouble with sick hogs.

To these items should also be added that of a reasonable diet. If we were to feed ourselves on corn-meal exclusively we would soon become sick and die of constipation or diseases engendered by it. In this respect also let us use the same common sense we apply in feeding ourselves. Give the hog a variety. Mix the coarse food with the concentrated, and see that they have access to plenty of green food, which they require.

We also find exercise is conducive to health. The same rule applies to hogs and all kinds of stock. In other words, instead of neglecting the hogs and treating them just as meanly as we possibly know how, apply to them the same hygienic and sanitary rules which are known and accepted as conducive to

the health of humanity, and it will be found that it is money in pocket.

But all farmers will not follow these hygienic rules, nor provide proper sanitary conditions for their stock. Therefore, as in the case of humanity, germs of disease bred among the indolent, ignorant and filthy are carried to the intelligent and clean, so that the innocent are made to suffer with the guilty. In like manner hog cholera and the swine plague are bred in the pens of ignorant or careless farmers and conveyed to the stock of the careful farmer, who is made to suffer on account of the delinquencies of his neighbor.

The question the National Rural has set about solving is how the careful farmer can protect himself against this carelessness of his neighbor. If a neighbor gets the smallpox or his children the scarlet fever, we carefully isolate them and use disinfectants to prevent the spread of the contagion. The doctor also disinfects the premises and his clothing for the same purpose, and if we are near neighbors we disinfect our homes, and in this way protect ourselves.

The same rule will apply in the treatment and prevention of hog cholera. This disease is caused by a germ much resembling a typhoid fever germ, so nearly so, in fact, that some authorities claim that it is typhoid fever. Like typhoid fever, it has its seat in the bowels. The germs are spread from the excrement and carcasses of the afflicted hogs. In this way the soil about the pen, the water supply if they drink out of a common trough or a pool, as is too often the case, and the food troughs become saturated with the germs, which in this way quickly spread from hog to hog until the whole herd is affected. To prevent the spread of the disease, therefore, and protect our hogs the same methods should be employed that have been found effective in preventing the spread of contagious diseases among mankind, viz., the liberal use of disinfectants and antiseptics. These antiseptics destroy the germ, and in this way prevent the spread of the disease and protect the hogs. Also, if used in time with their food when the case is not too far gone, the disease can be checked even after a germ has found lodgment in the system of the hog.

The following is a simple remedy which we have found effective in every case where it has been tried. The material, caustic soda, is one of the cheapest and most effective germ destroyers in existence. The following is our method of application:

Dissolve one pound of caustic soda in sufficient water to make one quart of mixture. Use as follows:

Take one-half pint of the mixture to every fifty hogs, and mix

it with their water or liquid food (slop). Stir it in thoroughly, so as to insure thorough dilution. No other medicine will be needed. When there is no hog cholera in the immediate neighborhood, use this mixture in this way once a month or six weeks as a preventive.

For a disinfectant, take one pint of the mixture to ten gallons of water and sprinkle with a sprinkling can over the hogs, observing care not to get the mixture into their eyes.

Also, make a solution of one pint of the mixture to two gallons of water, and with this mixture sprinkle their sleeping places. Once a month will be sufficient when hog cholera is not in the neighborhood.

In the event that hog cholera is near, sprinkle both the hogs and sleeping places, pens, as above, and everything connected with the hogs, at least once in two weeks, or more frequently, according to nearness or the prevalence of the disease.

For sick hogs use one-half to three-quarters spoonful of the first mixture three or four times daily. It must be well diluted with water and mixed with the slop. Shake the mixture well before using. Should any of it get on the clothes or hands, wash it off immediately, and be careful not to get any of the solution into the eyes.

The ordinary hog cholera medicine, and their number is legion, usually consists of a preparation of several kinds of drugs compounded together, and seem to be framed principally to help the drug trade. Only to the extent that they contain antiseptics, however, are they valuable. Sick hogs should be promptly separated from the herd, or, better still, the herd separated from the sick hogs. That is, if any of the hogs are sick, both the well and the sick hogs should be excluded from the pens and yards where the disease was contracted, and kept separate. Caustic soda is cheap. It can be had at almost any drug store. It is usually put up in pound cans, which sell at retail from ten to twelve cents. People who use common sense in the application of this remedy in the care of their hogs need not lose any.

Jas. W. Wilson,
Editor and Manager, The National Rural,
Chicago.

SELECTION OF FOUNDATION STOCK.

By Prof. John A. Craig.

IT will likely be most satisfactory for me to state briefly the things that I have had in mind in buying foundation stock of any kind. Having definite ideas of the kind of stock desired, and the most important qualities that are needed, it would then be well to visit a few of the leading and most reliable breeders of such stock. As a rule it is very unsatisfactory to buy animals without seeing them, and I think this is especially true when it relates to the purchase of foundation stock.

In visiting a breeder whose reliability is unquestioned, I would be governed largely by his advice in regard to the merit of the animals he is breeding. This may seem an unsatisfactory statement to the average buyer who is invariably suspicious of the breeder trying to sell him stock that has proven to be unsatisfactory. I have found, however, that when one gives a reliable breeder his confidence as to exactly what he wants, every effort will be made to secure it; but if the breeder gets the impression that the buyer thinks his statements are made for the purpose of selling his stock, then he is likely to be reticent about any of his animals.

Before inspecting a herd, I always like to have the history of it at my fingers' ends. It is always an advantage, as well as interesting, to have the breeder give an account of the sources from which he obtained the foundation stock. In presenting this to you he will invariably grow enthusiastic over some few of the best animals that he bought. They have likely proven to be good breeders, exceptional mothers, and in a thousand ways shown him unusual qualities. One of the best pieces of advice I can give to the novice is, to never forget the names of these animals, so that when you come to inspect the herd you will then know whether the animals being inspected spring from the best sources or not.

After becoming thoroughly posted as to the composition of the herd, inspect the animals that the breeder thinks will suit you. There may be some difference of opinion as to the best time at which to make the selection, but I have had much more satis-

faction through selecting animals as young as is possible. In our own herds, I would much rather make up my mind as to the merits of any animal just shortly after it is born than at any other time in its growth. I think the frame work and the natural form of the colt, the calf, the lamb, and the pig, can be studied more accurately then than at any other time of its existence. It may not be advisable to buy animals so early, but as soon as the pigs are weaned, a safe selection may be made.

It is unnecessary here to go into all details necessary to observe in choosing stock, but I wish to refer to a few things that seem to be of the most importance. I find that there is a common prejudice existing among most purchasers against buying old and tried animals. The more one has to do with breeding the readier he is to tie to the animals that have been tried and not found wanting. In the case of establishing a herd, I would much rather buy a sow, a cow, or a ewe that is past her prime, but is yet all right as a breeder than to purchase an untried animal. The idea is that you have in the one case tested worth, and but little risk, while in the other nothing has been determined.

In selecting either young or old stock, the leading point in my view is to see that there is every evidence of that very valuable characteristic which we call constitution. It is hard to define it for it takes in health, vigor, and thrift; but it is nevertheless known by all breeders and highly valued by every one engaged in the practical work of breeding live stock. It finds expression in activity and force of movement, brightness of the eye, and the general appearance of thrift in the hair and hide. It is observable in the deep chest, full body and low flank. It enables an animal to live long and fill its sphere successfully. It might be accepted as a guiding principle, that the possession of a good constitution should be noticeable at once in the herd.

Back of the individual, I would inquire into the hereditary tendencies. In such work as I have had to do in swine breeding, I have found some features having a strong tendency to be transmitted, and as these are practical points I think they ought to here take precedence over every thing else. In breeding sows, blind teats are not infrequent, and I have noticed that these are one of the things that are very often transmitted. In choosing a sow, see that she has twelve fully developed teats, six on a side, and that they run far forward. The words "fully developed" are used advisedly, for if they do not stand out from the body and also appear full, they are invariably blind, and in many cases they will remain so throughout her career. Again sows

are very often deaf, and in many cases where the young pigs are killed by the sow lying on them it is very often because the sow has been deaf and unable to hear the cries of her young. That this is transmitted, I know to be a fact from personal observation. That very important quality, prolificness in a brood sow is transmitted very strikingly. Some breeders keep this quality in mind and select their brood stock with this as the most desirable characteristic to secure. Where it is neglected it will be found that the litters as a rule are small in number. With this characteristic, the milking qualities are usually associated. They seem to depend upon each other to a degree for their proper development. There is as great a variation in the milking qualities of sows as in any other characteristic, and it is a point of very great importance, for on it depends the early thrift and growth of the young pigs.

Too much attention, thought, and expense can not be expended upon the selection of a boar. Not only should he spring from a good family, but in himself he should show those points that are commonly sought. First see that he is right individually, and then secure the parentage wanted. I would not on any account sacrifice one for the other. Masculinity, activity, and general vigor reflect possession of constitution and breeding powers. I need not say anything further in regard to the type, but I wish to emphasize one or two points in regard to the legs which, while receiving a great deal of attention from our breeders of late, have not been unduly magnified in importance. I refer to the shape and set of the hind and fore legs, and also the strength of the feet and pasterns. I do not know of any feature that is less to be desired in a boar than to find the hock almost buried in the ham, and then to have the leg from there to the feet slope far forward under the body. This I think is much more undesirable than crookedness in the fore legs, though buck knees and other deformities are almost as bad. Then see that the pastern is strong and that the toes do not spread out. Weak pasterns and splayed feet are not only undesirable in themselves, but they also indicate a loose knitting of the frame work which is incompatible with a form of the proper smoothness and symmetry.

Iowa Experiment Station.

—Bran, because of its character of composition, is not a wholly desirable feed for pigs. Middlings may be fed with profit at any time during the hog's life.

SUGGESTIONS TO PORK RAISERS.

By W. W. McClung.

PROFIT is what we raise hogs for, and the most pounds with least cost that will bring highest price gives most profit. In order to do this or to make a near approach to it, I believe it is absolutely necessary to have well bred stock to start with, then it is just as necessary that they be well fed, for the best results cannot be obtained without a combination of well-bred and well-fed. You will not get as much profit from either without the other as you will the two combined.

As to which breed is the best of the several pure breeds, I would say "they are so nearly equal in the essentials for pork making that no man can prove that he has the best." Therefore select the breed you think you would like best, and you will always "be glad you did not take the other."

Many men have what I believe to be a very erroneous idea that crossing one breed with another will be beneficial. I am aware that men have raised fine bunches of feeders from cross-bred hogs, but the best I have ever seen of the cross-bred ones have not excelled the best of the pure-bred or high grades.

The bad effect of cross-breeding is that you destroy the breeding quality of your herd for future use, for a half-blood, or rather a cross-bred sow will not breed as uniform as a pure bred or even a high grade, and uniformity and smoothness count in selling any stock for the block.

Men make these crosses because they say their stock is "running out," deteriorating; if it is, they have not done their duty in making careful selections of their sows for breeding and in choosing a boar. Perhaps by taking a boar that was not quite as good as another they saved $5. That plan is "saving at the spigot and letting it run at the bung."

The proof I have to offer that it is not necessary to cross-breed to keep hogs from deteriorating is the scores of men who for twenty, thirty, forty and even fifty years have bred and raised the same breed and have not only "held their own" but gradually improved their herds year by year, until to-day they are very much superior to the stock they started with. They have done this not only with one breed, but with all our pure breeds according to length of time the breed has been established. Any one can do this that will follow their example, i. e., select the best sows each year to breed from and retain some mature sows that raised the best litters the previous year, and

when they raise their second litters select some of these pigs for the young sows for future use and keep the old sows over again.

This I believe to be the key to success in selecting brood sows.

The boar, however, is of still more importance, for he is the sire of many litters each year, while the sow is the dam of but one; therefore hunt for a boar that is about right all over, as near so as you may reasonably expect to find, and when you find him buy him; buy him as cheaply as you can, but buy him.

A good many years ago I sold a boar for $50 to one of the most successful pork raisers I ever knew. I was surprised that any one except a breeder would pay that price for a boar, and I told him so. He said that when he found a boar that suited him, he never allowed any breeder to buy it away from him. Some men seem to fix a price that they will pay for a boar, and then hunt for a boar that they can buy at that price.

A much safer plan for profit is to start out to find a boar that will suit to use on your sows, and when you find him pay the price it takes to get him. Of course, you might find a man that asked an unreasonable price; if so, there is another good one somewhere; hunt him up, but be sure you always buy a good one, both in form and breeding. I have never known men who follow this method to complain of their hogs "running out," but instead there is a gradual improvement.

Without going into details, I would say every animal ought to be thriving (gaining) at time of mating to insure best results from the offspring. So liberal feeding at that time is especially necessary. It is sometimes hard to keep the boar gaining during the breeding season, but if you have milk, rich shorts and occasionally a piece of fresh meat to give him, and keep him in a good pen by himself and give but one service to each sow, he will generally respond satisfactorily.

The growth of pigs should be maintained from start to finish, and the only way I know to do this is to arrange a separate feeding place for the pigs as soon as they will eat or drink. They only require a very little at first, but by gradually increasing their feed as they grow older and their dams give less milk, they learn to depend more and more on their trough-feed, and then there is no "let up" of growth at weaning time, a critical time in raising pork for profit, and continued liberal feeding makes the most pork for food consumed; makes your hogs ready for market at any time, and makes you more certain of profit than any other method I know of.

Where large numbers are raised and fed, it is quite essential that they be divided into several lots, according to size and age, for large numbers of shoats fed all together will not thrive as well as if separated into smaller bunches, although the feed may be the same and fed in the same proportion. This is not only true as regards their feeding places, but is equally true of their sleeping quarters.

I know men who have a long row of sheds divided into small apartments, and after the pigs are weaned and have access to these sheds to sleep they make it their business every night for a week or more to see that there is about an equal number of shoats in each apartment, and after a short time each one goes to its place as a horse or cow goes to its stall. A little management at the right time saves time, vexation and loss later on.

Much more might be said upon this subject, but to sum up our points: To make pork raising profitable, these things are essential:—First, Well-bred stock, well-fed. Second—Careful selection of the sows for breeding. Third—Purchase the very best boar obtainable, even though the price seems a little extravagant. Fourth—Liberal feeding from start to finish.

Iowa.

SUCCULENT FOOD FOR SWINE.

By Prof. C. S. Plumb.

As writer views the matter, the main benefit to be derived from feeding succulent food to swine, lies in its special influence on the digestive organs. That is, the intestinal tract is kept free and open, and the action of the secretions is promoted. The use of the succulent food is shown in the condition of the coat and skin, and in a lengthening out of the body as it were. Pigs fed on corn or other dry food, with little attendant moisture, are less expansive in growth, if it may be so expressed. For brood sows in particular, succulent foods are valuable, as they not only favor a stretching out of the body, but they also promote milk secretion, which, of course, is very important. Further, where succulent food is fed in connection with grain, a more wholesome appetite will be likely to occur. The roots and most succulent foods, in themselves do not contain much nutriment. They contain from 70 to 90 per cent of water as a rule, the mangel having the latter amount. One hundred pounds of most roots contain one pound of digestible protein, as compared with about eight pounds of protein in 100 pounds of corn.

Most western pig feeders are accustomed to pasture pigs on clover or rye for some months in the year, and, when doing this, feed but little grain, In such cases, what grain is fed should be to cause increased growth, for the pasture ought, at least, in itself, to maintain the body.

Clover, rye or other grass, roots, artichokes, potatoes or other succulent foods are relished, and give good results.

From time to time the question is asked as to how pigs will do on artichokes. There is some diversity of opinion on this matter, but generally the reports have been in favor of the artichokes. At the Purdue Experiment Station we have this fall had four Chester White sows about six months of age, confined in a small lot entirely grown to artichokes. They were there four weeks, during which time they made a total gain of 83 pounds live weight, or an average of about three-fourths pound per day each. The most one of these pigs had per day was 2½ pounds, which food cost the station about one and one-half cent, which allows more than enough to pay for the artichokes.

Friends of the writer, who are very extensively raising and feeding pigs, having at present 1,600 head, have found that sows feeding in an artichoke field, had a growth that was of such a satisfactory character, that they increased their area this year for that crop to a considerable extent.

In his work on "Feeds and Feeding" Professor Henry gives some interesting results of feeding roots to pigs in Denmark. These figures relate to feeding hundreds of animals. In one experiment with twenty-five pigs, where sugar beets were fed seventy days, it was shown that one pound of barley had a feeding value equal to six to eight pounds of mangels or four to eight pounds of fodder beets. In experiments with four kinds of mangels or beets and grain fed 204 pigs, such satisfactory results were secured as to cause the authorities to conclude that about forty per cent of the daily ration of the pig may be advantageously made up of roots. The results of the slaughter, also showed that the root fed pigs produced a grade of pork of a quality fully equal to the grain fed ones. In experiments with carrots and mangels, on 893 pigs, divided in 175 lots, it was found in the comparison, that these roots contained equal quantities of dry matter and had similar values in pig feeding. In fact the amount of dry matter in the roots is the main factor of importance, rather than the amount of sugar or the weight. When turnips were compared with whey, and the roots substituted in part for the whey, barley and whey gave returns of

1.08 pounds daily per head, while turnips gave only .96 pound, showing an advantage in favor of the whey.

At the Wisconsin station, two different experiments have been reported on in feeding swine rape. The first trial was on twenty Poland China pigs about eight months old. Lot one, of ten pigs, was folded in the rape, while lot two was kept in pens and fed the same grain as lot one. The plan was to make the same relative gain with both lots, but with lot one to replace a part of the grain food with rape. The two lots, at the end of seventy-six days, had made essentially the same gain, and it was shown that lot one ate about one-third of an acre of rape, and this saved 710 pounds of corn and 352 pounds shorts, or 1,062 pounds grain. An acre of rape was in this case worth about 3,318 pounds grain. In 1896 a similar experiment was conducted at the Wisconsin Station, with Chester White pigs. The experiment lasted forty-nine days, during which time lot one ate six-tenths of an acre of rape, 886.2 pounds of corn and 444 pounds shorts, or 1,330.2 pounds less of grain than lot two, while making practically the same gain.

From these two trials it is concluded that one acre of rape is equivalent in value to 2,657 pounds of grain in hog feeding.

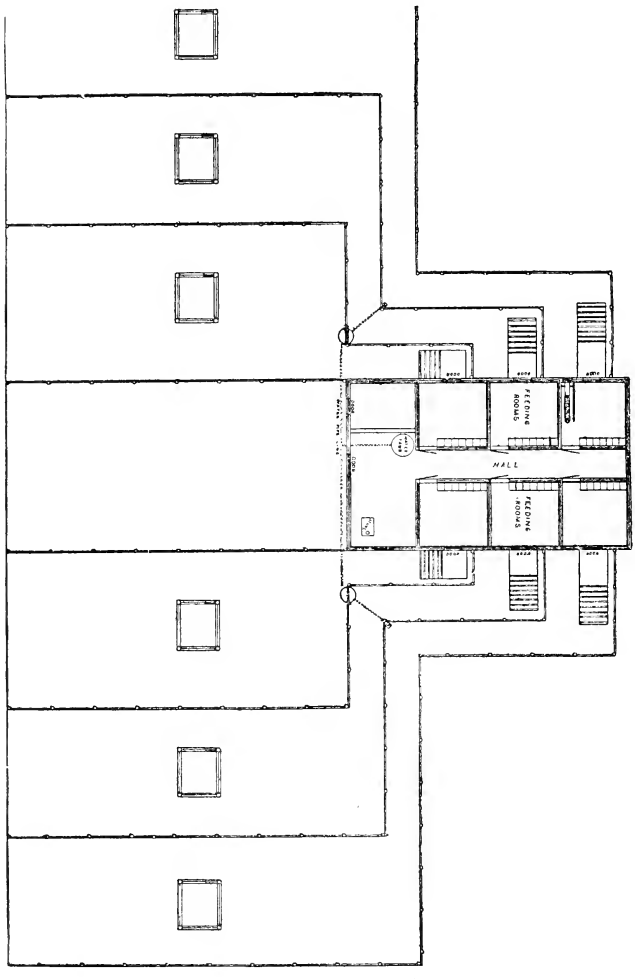
Other experiments might be cited to show the value of succulent food for pigs, but the above sufficiently brings out the fact that such food may be fed to advantage from the point of gain. To this feature, one must add the great value of this class of foods in their influence on the digestive system of the pig, which with breeding stock is all important.

Purdue University.

A MODEL HOG BARN AND FEED LOT.

By James Riley.

IN order to make the business of producing pork profitable, we must reduce the labor of feeding hogs to a minimum. This I secure by building a hog house and suitable lots so the pigs can come to the house for their feed instead of carrying it to them. My hog house is forty feet long and twenty-four feet wide with a hall four feet wide through the center. On each side of the hall we have three pens ten feet square. We have seven lots containing one acre each. In these lots we have grass and shade. The lots are connected with the feed pens in the house by a narrow lane four feet wide. The feed room is in one corner of the house, 10x14 feet. Our water is



Ground Plan of Hog Barn and Feed Lots, owned by **James Riley, Thornton, Ind.**

supplied by a spring, and is conveyed through an inch pipe under the ground and raised in a three-barrel tank in the feed room and from there to two barrels outside the house.

Our lots are fenced with strong, smooth wire fence that is absolutely pig and boar proof.

The squares in the feeding lots shown in the cut are sleeping houses.

HOW WE MAKE PORK IN WISCONSIN.

By Thomas Convey.

TO make pork in Wisconsin we follow methods similar to Iowa and Illinois. In the south and west part of the state, we can raise just as good corn and as much to the acre, and corn is the ideal food for swine with a large majority of farmers. On the north and east side of the state they raise hogs in limited numbers, and follow eastern methods; raise two litters a year from breeding stock, and in many cases feed in small yards and pens.

THOMAS CONVEY.

There are many features of hog raising here and elsewhere that I consider very faulty. One is the indifference or want of judgment in the selection and development of breeding stock. As your skillful mechanic insists on having suitable tools to work with, so too does the skillful feeder expect to better his prospects by selecting the right type of animal. Any animal used solely for making meat should be thick-fleshed, low down, broad backed and with a good head, the latter indicating a good disposition, which is absolutely necessary for rapid growth, and as much length of body as it is possible to get without unevenness of upper or lower lines. A long, round body is not desirable, animals of that kind stand on long legs and are always gross feeders and do not give sufficient returns for food consumed. They are usually rapid growers, but of slow maturity and poor quality.

Another type is represented by "fancy head and ear," as the breeders say. We have not yet succeeded in getting a good sized horse with a colt's head, nor a good sized hog with that type of head and ear. Nice little hogs have become quite num-

erous, but not so popular as formerly. Some farmers rave about coarse bone, meaning the fleshy-legged, soft-jointed variety, that are always crippled, rheumatic and out of order, and about as useless as the big-legged horses of the west—apparent size, but not quality.

If farmers are anxious to secure more size and corresponding quality, they should breed from mature stock, not necessarily older, although that is desirable, but more liberally and judiciously fed, and better grown. They lose their sows at farrowing, because the sow is scarcely more than a weaned pig in size. We get all the growth we can from start to finish on foods that are not too concentrated, one-third being corn, the rest middlings, milk, roots, peas and oats grown together, and grass always when available, that is when it grows.

We would not depend on grass alone for a single day, nor even grass and milk. Grain, and corn is the best of all grains for this purpose, fed on pasture, will give treble the returns during the summer season that it would in winter. I have never been afraid to feed soaked corn on pasture, and have never spoiled breeding stock nor had unhealthy hogs. One-third of a winter ration will be sufficient.

A very wasteful system of feeding is followed on most farms, that is scant feeding the greater part of the year, and then gorging just before marketing. This is especially the case in time of low prices, as if it did not take better breeding and better management when prices are low.

When a hog is not moving forward in growth he is going backward, and the food you give is worse than thrown away in the former case, because you have a stunted pig to start. While he may make greater growth on liberal feeding later, he will not make as much growth for food consumed, and that is what we are all looking for—economical production.

We occasionally yet see farmers who are anxious to get the fact published that they have marketed the heaviest hogs, making a parade of their folly. Those fellows have evidently not learned yet that the last fifty pounds on each hog cost them just as much as the last 100 pounds on each of their neighbor's lighter hogs. If they get any glory, they pay for it. A case of ignorance and bliss.

Many farmers do not appreciate the necessity of providing comfortable quarters for stock. At one of the experiment stations, recently, they found it took twenty-five per cent more feed in a comparatively mild climate, but where conditions were classed as uncomfortable. Again some well-meaning people ab-

solutely poison stock with bad air. This is very noticeable in the north part of this state. They provide a small pen as nearly air-tight as they can get it, fill it with hogs, and make no provision for fresh air. They can not keep the bedding dry. Their hogs have coughs, catarrh, rheumatism, etc., and they want to know if their hogs have the cholera.

We have found it more desirable to have a pure atmosphere than very warm quarters. An abundant supply of dry bedding, preferably on a ground floor and no exposure to wind or draught in their sleeping quarters, and for sows with pig it should be partitioned so they can not bunch up and overlie each other.

Speaking of a pure atmosphere, reminds me that I have never raised healthy young pigs where there was a disagreeable atmosphere, which is usually the case around old pens with leaky floors. This is one of the principal causes of scours, snuffles and kindred complaints.

Many of the experts say, get the young pigs to eat as soon as you can. Don't believe it. Have the sow in good condition when she farrows; after a week, give her all she will eat and feed often, but not to clog her, and don't worry about the pigs. When they are determined to have feed at about a month old, let them have it gradually at first; later all they want. I know nothing better than soaked corn and skim milk, except it might be new milk, but I am talking of pork, not prize winners, nor hogs that are worth more than their nominal owners.

We never wean pigs, and really don't know anything about it. The sow attends to that matter with such skill that the pigs don't seem to know when it happens. We use ground feed for swill only. Peas and oats are fed whole and raw. Cooking whole grain does not pay. Soaking is right for warm weather. Warm slop in cool weather is very desirable, in fact necessary for young stock.

We have no respect for the opinion of the hog breeder who has to keep a medicine chest for his hogs. He is a quack. Ailments are usually the result of faulty conditions or diseased breeding stock. We always warm slops in winter time and cook roots and mix ground feed with them; also milk. We throw a common shovelful of ashes in swill every time we feed. Of course, pigs need all the salt and fresh water they care for. The above quantity of ashes is sufficient for fifty hogs.

It does not pay to run a farm to corn and hogs at present prices, but dairymen can make a limited amount of pork at a profit with pork and grain at present prices.

There are some farmers here and elsewhere that raise their summer pork for family use with current funds. They sell their hogs this fall at about three cents to pay for cured meats, they eat during the summer at ten to twelve cents. Those are the fellows that are howling about bad times.

THE BACON PIG.

By Prof. Thomas Shaw.

THE cry has gone up from nearly all parts of the land against the bacon pig. And nowhere has that cry been so loud or so fierce as in the corn belt, that place above all others where the bacon pig would help to bring healing to the great source of disease which is preying so heavily upon the swine in so many parts of the country. It is not the first time, however, that men have been found resisting what would bring them great benefit when the attempt was being made to help them. The history of vaccination to prevent the smallpox will furnish an instance to sustain the statement just made. Men have positively resisted vaccination and its introduction into communities in which it has since wrought untold benefit. But these were communities in which dense ignorance prevailed. In that respect they were very unlike the intelligent men who are kicking so hard against the introduction of the bacon pig. And this feature of the resistance is its most surprising element. If they were ignorent men from whom better things could not be expected one would not be so much surprised at their attitude in this important matter, but they are the most intelligent class of farmers to be found in any country, and this attitude can scarcely be attributed to preversity of will, for our American farmers are usually among the most reasonable of men. I give the problem up. I cannot tell why our bright and thrifty farmers should act so much like children in this matter.

I suppose the simplest answer is that it is a pig which produces bacon. I think that is the answer that a school boy would give, and I question if it can be improved upon. If the answer would be correct, and I fail to see why it is not, it follows that a majority of our swine-growers are not growing the bacon pig. Now bacon, as everybody knows, is side meat with fat and lean streaks in it. If the lean streaks are absent, then side meat is not bacon, it is lard. Now it is the office of lard to melt and dissolve away when it is being cooked. If side meat, when cooked, has so much lard in it that it nearly all dissolves while it is being cooked, it eludes the grasp of the man who wants to

eat it. He cannot eat it as bacon. He can only eat it as gravy. If that were all, it would not be so bad. But by the action of a law which some teachers in the schools call the law of convellation, if the whole side is fat, that is to say, lard with a little tissue holding it in place, there will be much of the same found in certain other parts of the animal. The fat as compared with the lean in the whole animal is excessive, hence the proportion of the lard to the meat is excessive. The evils resulting are many.

First, the object for which pork is grown is so far lost sight of. It is grown both for the meat and the lard, but the former is the chief end for which it is grown. This end, therefore, is measurably unattained when the proportion of lard is excessive, and it is attained in proportion as the lean prevails. The average consumer prefers meat and especially bacon that is well streaked to that so-called bacon which is all fat. And the preference is in the interests of health. Meat that is nearly all fat or oil is, especially in the summer season, an unhealthful morsel, hence the wisdom of trying to grow the bacon pig on the score of health in the consumers.

But, secondly, the health of the pig is also concerned in this matter. Excessive obesity is prejudicial to health in man and in beast. It disinclines the animal to take sufficient exercise to keep the functions of the body in the most vigorous action, hence the animal falls an easy prey to various forms of disease, such as hog cholera, rheumatism, and breaking down of the limbs. Of course this statement is made in the full knowledge of the fact that cholera is a germ disease, but even so, the assumption will not be questioned that a germ disease will prove less fatal in a herd of vigorous swine than in a herd whose vigor has been impaired for successive generations by obesity, the outcome of improper breeding and feeding. For the sake of the health of our swine, therefore, we ought to aim to grow the bacon pig rather than the lard pig.

And, thirdly, the bacon pig is certainly a more vigorous and reliable breeder than the lard pig. Of that fact there can be no question. The complaint has gone up from all the corn states that sows not only frequently fail to breed altogether, but when they do breed, they produce small litters, and they do not in many instances nourish them well. It could not be otherwise. Obesity is unfavorable to procreation, hence if pigs are kept all the time in what may be termed a fatty condition, they cannot breed as they otherwise would. The dairyman will tell you that there is something in conformation in its relation to milk production, and

so there is. In that matter the dairyman is right. But conformation does not affect milk-giving alone in cows. It affects milk-giving in all classes of domestic mammals, and probably no less in the sow than in the cow. There is, perhaps, as much difference between the milk-giving properties of individual sows as between the milk-giving properties of individual cows. And it is a fact that cannot be gainsaid, that the very short, thick, anti-bacon sow is a poor breeder, and deficient in milk-giving qualities in proportion as she conforms to that type. On the other hand, sows of the pronounced bacon breeds, as the improved Yorkshire and the Tamworth, are "prolific" and good milkers wherever they are found.

My contention is, therefore, that in the light of self-interest, we ought to grow pigs of the bacon types, whatsoever the breed. I am not in this paper advocating any particular breed, nor am I advocating any change of breed, but I am advocating at least some modification of types in many of the breeds in this country, and I am asking that such modification shall be made in the direction of that form which in its essentials is characteristic of the bacon pig.

I may now be asked, and very properly, what are those leading essentials of form that indicate bacon quality? I will answer this question first positively, and second, negatively. The leading essentials in form of a bacon pig are, first, good length and depth of body without excessive width. Secondly, limbs strong and of medium size. And, third, head and ears and neck of memium size. That is not a bacon pig which has a very short, compact body, a frame broad in proportion to its length, and that stands on small and short legs. It is a lard pig. Nor is that a bacon pig which is razor-back and grayhound in its build. It is a scrub that would soon eat its owner poor. The bacon pig is not a hard feeder. It is a pig that will turn its food, not into an unhealthy substance that melts away in cooking, but it will turn it into good meat.

But it may be asked, is not the bacon pig a harder feeder than the present type of pig? I answer I think he is, but I think not a hard feeder. Then the question will naturally follow, should we not give the preference to the easiest feeding pigs? I answer no, not necessarily. We should give the preference to the pig that will bring us the most money. Easy keeping qualities is only one consideration. In growing meat, we must take several considerations into the account. The standing argument in favor of the American hog as he is at present rests upon that one idea that he is an easy keeper. But the bacon pig is superior in

stamina, in breeding qualities and in the quality of his meat, and he is withal not a hard keeper. Now, put the first named quality in the one scale and all the other named qualities in the other scale, and tell me candidly which weighs the most?

Look into this question, therefore, of the bacon pig. Do not look at it through the eyes of prejudice. It is a great question. The reception that we give to it will have an important influence on the prosperity of this nation. If the bacon pig is an existence that we cannot afford to tolerate, by all means keep it out. But if it is a creation that will do us good, let us try to possess it. Our American farmers have been singularly sharp to recognize a good thing when they see it. May they ever retain this commanding quality.

University of Minnesota.

HOW WE MAKE BACON IN CANADA.

By Prof. G. E. Day.

OF the bacon exported from Canada, the Province of Ontario furnishes about ninety per cent. The export bacon trade of Canada for the present year will probably reach about eight million dollars, a very fair showing, considering that the trade is of comparatively recent origin. Though there are various kinds of bacon exported, Canada's export staple is what is known as "Wiltshire bacon," the greater part of which is taken by the city of London. The London market is very fastidious and extremely exacting in the matter of weight, amount of fat, quality, etc., and consequently it taxes the skill of the Canadian feeder and packer to satisfy its requirements. If the side of bacon is too heavy, too light, too fat, or too thin, London will have none of it. It is not a matter of price, for London will not take it at any price.

PROF. G. E. DAY.

For the production of Wiltshire sides, hogs should weigh from 170 pounds to 200 pounds. The fat along the back should be from an inch to one-and-a-half inches in depth, and even in thickness from tail to neck, no "pinching" at the loin nor bulging over the shoulder. The meat should be well streaked with lean, and the belly meat should be thick. There should be good length and depth

between shoulder and ham. The shoulder should be light, the back only medium width, and the ham fleshed well down to the hock. The neck should be comparatively light without any arch on top, the jowl should be as light as possible, and the bone medium—not coarse, nor yet so fine as to indicate weakness. The true bacon hog is not a "razor back" by any means, but a shapely, thrifty, growthy hog, carrying a minimum amount of cheap and comparatively worthless material, with a maximum amount of high-priced meat. He forms a striking contrast to the heavy-jowled, arched-necked, squat-shouldered, short-sided, unwieldy masses of lard which delight the hearts of so many feeders. When a hog with a short, arched neck and heavy-shoulder is split down the back, there will invariably be found an excessive thickness of fat over the shoulder, and a lack of uniformity in the thickness of fat along the back. This defect renders it unfit for a number one side, and it must go into a cheaper grade. Frequently, though not always, the fat-backed hog has a thin belly and a poor development of lean meat. This combination is one of the worst imaginable from a bacon standpoint, for thick, lean-streaked bacon is not to be found in such an animal.

It has been thought advisable to devote some space to the type of hog suitable for best export bacon, for without the right kind of hog the feeder is powerless. It has been boldly asserted by some writers that the production of the bacon hog is entirely a question of feeding. It is true that injudicious feeding may spoil a good hog, and that skillful feeding may improve a faulty type; but the same is true of the dairy cow, yet who would argue that selection should be ignored in improving a dairy herd Food can do much, but its influence is limited, and it cannot overcome individuality. The right kind of hog and the right kind of food must be combined in producing number one Wiltshire bacon.

It must not be inferred that we have nothing but the best bacon types of hogs in Canada. Practically, all the leading breeds are represented. In experiments at the Ontario Argicultural College during the last three years, where representatives of six different breeds have been fed side by side and shipped to the factory for examination and criticism, the Yorkshire and Tamworths have had rather the best of it. Berkshires have come next, while Chester Whites, Duroc Jerseys, and Poland Chinas have been quite seriously faulted as producers of export bacon. But the best breeds are not without their defects, and probably the most satisfactory hog for the average farmer is

the cross-bred. In this connection, the Yorkshire and Tamworth have been found valuable for modifying the thicker and fatter types.

It is a common belief that the bacon hog is not such an economical producer as the fatter, shorter type. This question is still under investigation, but up to the present time our experiments indicate that there is little foundation for the belief.

As to methods of feeding, practice is extremely varied. A point which has caused our packers much trouble and anxiety is the number of soft sides which have appeared of late, and which seem to be rather on the increase. A soft side is not necessarily a fat one. There seems to be no apparent relation between the amount of fat and the firmness of fat. The softness developes while the sides are in the salt, and when they are taken out, the fat has a soft, spongy feel. This softness very seriously detracts from the value of the bacon and means a considerable loss, first to the packer, but ultimately to the farmer, because the packer will make good this loss when subsequently fixing prices. Since softness seems to be on the increase with the increased use of corn, it is commonly believed that much of the trouble is due to feeding young pigs too much corn. Clover has also been blamed, but experiments up to date seem to explode this theory. Investigations regarding corn are anything but complete, and it is too soon to speak positively. In the light of present knowledge, however, it seems probable that corn and careless feeding are largely responsible.

For young pigs, wheat middlings and shorts with skim milk are commonly used, and give excellent results. Whey also gives good results if fed carefully with the middlings or shorts, but it is well not to commence whey feeding until the pigs are between two and three months old. At an early age, barley may be added to the ration with advantage, and hogs finished on barley and shorts with or without milk and whey may be made into first-class bacon. Roots are growing in favor as a part of the winter ration, and are fed both raw and cooked. Fed in moderation, they are in every way desirable, affording variety and acting as regulators. They are found especially beneficial where the hogs have little exercise. Many good feeders steam the roots for young pigs, and mix them with the meal ration to warm it. This plan is a good one, especially in cold weather.

Much is said about Canadian pea-fed bacon, but in reality there are fewer peas fed in Canada than is generally supposed, and in many sections, where the peas are badly affected by the weevil, the hogs do not know what peas are. Peas, however,

make a good quality of bacon, but are most economically fed mixed with other grains. In fact, the greater the variety of foods, the better the chance of producing good quality.

For summer feeding our farmers are beginning to learn the value of clover. Both red clover and alfalfa are used for pasture, the former being most commonly grown, and in some cases vetches are employed for the purpose. This method has proved to be an economical way of making bacon, and it has yet to be proved that the quality of "clover bacon" is not up to the standard. Good results are obtained by feeding a two-thirds meal ration while on pasture, and when this plan is followed, it is improbable that any evil effects will be noticeable.

From what has been said it will be seen that there is considerable lack of uniformity both in breeding and methods of feeding hogs in Canada. We have much to learn yet regarding bacon production, but our education is steadily progressing, and we hope to improve the quality of our product as knowledge increases. Our packers still receive a large number of undesirable hogs, but the number of good hogs is increasing, and will no doubt continue to increase.

To sum up, the production of the best bacon requires intelligent selection of breeding stock, judicious feeding and exercise to develop muscle rather than fat, and marketing hogs at the right time, neither too fat and over-weight, nor too light and thin.

Ont. Agr. College, Guelph, Canada, 1898.

THE BEST MARKET HOG.

By W. S. Hannah.

BEFORE the first little pig went to market, or even before the domestic pig existed, and long before Chas. Lamb's famous roast pig, the kind of pig to grow was a question even in the mind of the earliest inhabitant; but even before the pig had a public market value and long before the days of packing houses and export trade, the question was settled by that famous old couple Jack Sprat who would eat no fat and his wife who would eat no lean.

Just so, all questions are settled according to the public taste or demands, or according to the contents of the purse.

There are at least three things for the central western hog grower to consider in connection with this question, namely: the kind of food grown, the general market demands and the

general surroundings. As to the first of these, there are localities where the grain grown, either on account of soil and climate or from force of habit, would not furnish suitable food to grow bacon hogs at all; as a matter of fact, it is doubtful if there ever will be much of a chance for the bacon hog in any locality in the great corn belt.

Although the central western packers are large exporters of pork product and spend a great deal of money and labor to produce cuts of meat to suit the tastes of the foreign trade, and although the business of the past few years has been very large, the so-called "singer" and "bacon" hog have not been sold at a premium over the heavy, well-fatted "lard" hog as regularly as for some seasons several years ago, and as a consequence there has been little or no inducement to the farmer to pay particular attention to raising anything but just "plain" hogs and unless the packers of this section show more desire for "singers," by paying a sharp premium for them, it is doubtful if our western hog growers care to abandon corn raising for the growing of unfamiliar products.

The usual farmer is a conservative individual and is not much given to experiments, so the son follows in the father's footsteps, growing the same crops the father grew and raising the same kind of stock the father raised; if he moves to a new country he must either take up with the farming customs he finds there, if they differ from what he has been used to, or experiment at a loss, to finally fall in with his neighbors and profit by their experience. This idea of conservatism is not confined to farmers alone but is inherent with all men, and not only accounts for the clinging to old forms and methods in all business, but paradoxical as it may seem, is at once the basis of shiftlessness and the balance wheel of commerce. Let me illustrate. One season a hog raiser comes to market with a prime load of 350 pound barrows on which he has spent a great deal of time and to which he has fed a large corn crop; he finds that instead of topping the market, as he had naturally expected, that a little, thin "slab-sided yorker" outsells his hogs twenty-five cents. If he has not investigated before, he commences to inquire into the reason for this and finds that at that particular time there is a large demand for a light supply of such hogs to meet the requirements for home bacon and certain cuts for foreign trade. He goes home with the determination to meet the requirements the next time, and comes to market with unfinished hogs to find that well-fatted hogs weighing 250 pounds and over are at a premium instead of the bacon hog; it is this sort of thing that

disgusts the hog raiser and encourages carelessness on the farmer's part in making the most of the conditions.

I have seen many such cases and know that these are the conditions under the present uncertain demand for the so-called "bacon" hog, and until such demand is made more regular and definite by those who have it in their power to regulate it I do not see how the farmers of this section can be expected to give particular time and attention to anything but the old-fashioned way of developing hogs for market. But once let them be shown that there is a steady demand for this particular class of hogs and the country will furnish them.

They will take pains to raise just the kind of food needed and to make all things count in the development of the pig from the litter.

Let the farmer know what is wanted and what is needed and show him the progressive machinery and he will furnish the balance wheel.

The trouble now is there is too much of a tendency to consider a pig as an animal unworthy special attention, and so he is turned loose to "root hog or die," and as a consequence he makes a poor showing, specially if his nose is adorned with jewelry or slitted in the old-fashioned way. The pig does the best he can, and as the farmer has been used to taking just about so much time to market him, he is not thought worthy of development in his young days.

Experience teaches that it costs more per pound to put on the third 100 pounds than either of the two previous 100 pounds; if, then, pigs were marketed oftener at around 200 pounds or less it would certainly be more economical to do it, providing the demand for such weights could be more regularly maintained.

Our English and Canadian friends smile at our cuts of hog product in comparison with theirs at around twenty-five per cent less in price. But the question here is, can we not afford to sell for much less with our cheaper land and crops and wholesale ways of feeding and marketing?

But suppose our packers should say to our farmers, "We want to complete with the Canadian, English, Irish and Danish meats in England; ship in your hogs to meet our requirements." Why, then, could not our packers obtain just as good prices as the others and afford to pay the country in the open market higher prices for grades of hogs to meet the needs?

At the present time the heavy, well-fatted hogs are in most demand, but to meet the general requirements of the past few years all the year around good quality barrows or sprayed sows

well finished and weighing from 230 pounds to 270 pounds are in most demand.

As to breeds: they all have their friends; the admirers of the Poland-China are just as firm in their belief in their value as the adherents of the Berkshire, Chester White or Duroc-Jersey, but at the present the Poland seems to have the lead, or, rather, is more plentiful; however, a full load of either grade of proper weight and flesh will top the market any time.

Although killing qualities count in hogs as with other live stock, there is just as much prejudice in favor of nice appearance as with cattle, and it always pays to make the best possible show of a consignment of hogs on the market by having them as even in size and flesh as can be.

The farmer wants to secure the greatest amount of gain possible for the feed he uses, and where impracticable to raise thoroughbred hogs of any grade I would suggest the cross of Berkshire and Polands or Duroc-Jersey and Polands, as both are good gainers and sellers on any market. And no matter what kind of sows you have always procure the best boar possible.

What shall be done with old rough-bellied sows, is a question to trouble a good many hog raisers. Do not run them to market half-fat as soon as they are "bred out," as they hurt the sale of other hogs with which they are shipped or sell for a mean price when disposed of on their merits. Fatten them the best you can and cover up their roughness before you dispose of them.

To sum up, let me say, under existing circumstances, that it is impracticable to raise the Tamworth or any other breed of so-called "bacon hog" or grow any particular crop for the development of this class of hog; but make the most of the breeds as found by finishing them to 230 pounds to 270 pounds as early in life as possible, and it will be found, if economically handled, that there is money in hogs.

Hogs marketed when fat and not held for a rise in the market are good mortgage raisers, or what is better, a preventive of the best type

Kansas City.

—The old system of keeping pigs in the pen from weaning to butchering time has given way to the more healthful and cheaper way of allowing them the run of a lot during the greater part of this time. The clover lot is an important factor in pig growing. While on clover the pigs should have an allowance of grain.

THE HOG THE PACKER WANTS.

By Louis F. Swift.

NO animal has done more to lift mortgages and convert cheap farm products into ready money than the hog. He will grow and give a pretty good account of himself, even if treated upon the "root hog or die" plan, and yet no animal responds more quickly to careful, intelligent and common sense treatment. Through over-refinement in breeding, or injudicious use of too-concentrated or improper food, he sometimes comes to grief and rushes pell-mell over the cliff into the sea of hog cholera, as it were, as if he was really possessed with evil spirits, but with whatever shortcomings he may have, he is truly one of the best and most available money-makers for the average farmer. For that reason, a careful study of the hog and his treatment is well worth while.

The plan of the editor of the "National Rural and Family Magazine" to bring this matter to the attention of farmers is commendable, and I am glad to answer as best I may his practical questions as to the best and most profitable conditions for marketing this valuable food-animal.

In answering the question, "What weight of hog usually commands the highest prices, and why?" I should say from 175 to 250 pounds. Such hogs yield a larger percentage of high-priced meat—they are not too fat.

In a general way this answer will also apply equally well to the question, "What weight of hog is in greatest demand by packers, and why?" although there are times when special cuts are wanted, or, for instance, when lard is scarce and high, that heavier and fatter hogs will command a premium. Then, again, there is always a demand for 170 to 190-pound hogs suitable for making the best bacon. Such hogs sell at top prices even when the general average weights are running heavy.

A most affirmative yes can be given to the question, "In buying hogs, do you inquire how they have been fed, or upon what kind of food; and does the kind of food upon which they have been fatted affect the price, other things being equal?" Wheat or corn-fed hogs bring the best prices. Hogs fed on soft food are discriminated against, and those fed only upon nuts and mast are oily and undesirable.

In replying to the question, "What breed of hogs do you prefer, if you have any preference, and why?" will state that Swift and Company prefer Berkshire and Poland Chinas because they yield the largest percentage of high-priced products. On the

other hand the Yorkshire and Tamworths are more favorably regarded in Canada and abroad, where the English bacon trade is catered to.

The question, "Have you any preference as between the black and white hog? If so, why?' has an element of business sentiment back of it. Butchers who purchase whole carcasses prefer white hogs; they are more attractive for display. But for packing purposes no preference is shown. The black hog is as desirable as the white animal.

The question, "Is there a sufficient demand for the bacon hog, such as is produced in Canada, Ireland or Denmark for the English market, to warrant an increase in the production of such hogs by the American farmers?" calls for a more extended answer. There is a sufficient demand for bacon hogs. The English market each year uses a large and increasing amount of a superior quality of bacon. In the main it is supplied by home-curing and by importations from Ireland, Denmark and Canada. This bacon cannot be made from the ordinary American type of hog, nor can it be made from light hogs, young or otherwise, of the breeds we have in general use. Light hogs of course make light bacon, and there is occasionally a demand for light bacon that makes light hogs sell at a premium, but it must not be supposed that these light hogs are made into the class of bacon that the English market wants at fancy prices.

If our farmers would produce a bacon-type of hog, using those breeds that furnish this product in Ireland, Denmark, or Canada, and what is still more important, feed and breed for bacon, they could produce it at a profit and still at a price which would enable American packers to supply the fine bacon to the English market.

For such a type of hog the packer could and would pay a higher price than for the ordinary hog. A good deal of misapprehension on this point exists because light hogs do not always command a premium. As before shown, the fact that a hog is light is not evidence that he will make the high grade bacon wanted. In fact, light hogs such as we get now are used simply to make light bacon for ordinary use, and such bacon does not always command any premium over the heavier sorts. When it does the packers pay more for this class of hogs; when it does not they pay less, because the balance of the hog is less profitable.

Another point to be understood is that no packer can afford to undertake to supply any special grade of meat unless he is sure that he can secure a steady and sufficient supply of the raw

material. Unless there are enough bacon hogs to insure this sufficient supply it is not reasonable to expect them to command the price they would if the packer knew it was safe to notify his customers abroad that he would furnish them the bacon wanted in any quantity and for delivery at any forward time named.

When asked whether "the bacon hog can be as profitably or more profitably produced by farmers in the corn belt than the common American hog?" I can only answer that this is a question depending altogether upon local conditions. The man who fats his hogs as part of his cattle-feeding, using them to utilize the droppings, cannot grow a bacon-hog at all. Whenever the daily receipts show a satisfactory percentage of true bacon-hogs they will command a substantial premium. The question of whether that premium will be enough to offset increased cost of production will be settled by each individual for himself. We believe that the man who devotes his attention intelligently to the production of the bacon hog will get more money for his work than the ordinary hog raiser.

The question of the corn-belt cuts little figure, as an exclusive corn-feed will not make the quality of meat wanted. Corn can be only one element in the food. The Canadians use largely peas, barley, oats, wheat-bran, and shorts. The need is for a food that will form a large percentage of lean meat, and corn furnishes fat and heat.

The question, "From your experience as packers and marketers of pork, what suggestions have you to make to the hog raisers as to what is the most desirable hog for market and how should it be made?" is most important.

I advise farmers to market younger hogs—hogs that mature at about six months of age, and weigh from 175 to 250 pounds. A painstaking, successful Iowa farmer, who aims to mature and market his hogs at six to seven months, weighing 220 to 230 pounds, says experience has taught him that with corn worth 25 cents per bushel the first one hundred pounds of hog cost him $2.00, the second $2.75, the third $3.50, and the last hundred pounds of a four-hundred-pound hog, $4.25. This in view of the fact that as a rule the 175 to 230-pound hogs are in best demand, and consequently sell at best prices, added to the tied-up capital and greater danger from disease, by holding hogs to make them heavier, makes a powerful argument for early maturity.

If a feeder had unfinished cattle, and could not replace his 230 pound hogs with shoats, it might pay to hold longer; but circumstances always alter cases. As a rule Americans seem to

lack confidence in their ability to produce the best. It is not so with people in some other countries. In England nothing ever quite equals home production. They pay more per pound for home-grown beef than for American beef, but only when the latter is labeled. Sold strictly on its merit as beef, the American product always wins its way with the best judges, and I think it will be so with our hog products. If our farmers were in Canada, it would be wise for them to do as the Canadians do, and vice versa. We must work our own problems in our own way. We believe that American farmers can make the most money, and produce the finest hogs in the world, by using, say, the bone and muscle-making grains upon grass until the pig weighs about 75 pounds, and then carefully bringing him to early maturity on good, sound Indian corn.

Chicago.

THE HOG CHOLERA QUESTION.

By Dr. D. E. Salmon.

THE great losses from the contagious diseases of swine early attracted the attention of the Department of Agriculture and of Congress, and an appropriation for the purposes of the investigation was made in 1878, with annual provisions for continuing this investigation until the present time. Two diseases, closely resembling each other, yet caused by distinct germs, and frequently both affecting an animal at the same time, have been recognized. The question of formulating practical measures for controlling these diseases has been as difficult as it is important. While most prevalent in the great corn-producing states, the diseases have been carried to all parts of the country; and, therefore, any regulations to be effective must be enforced over a wide extent of territory, and would be correspondingly expensive. The losses have, however, been tremendous, being placed by some as high as $100,000,000 a year; an estimate which does not appear exaggerated in the light of the careful inquiries in the state of Iowa, from which it was concluded that this one state lost from $12,000,000 to $15,000,000 worth of swine in a single year.

The scientific investigations relating to this subject have been persistent, careful, and comprehensive, and the problems that are to be met have been very clearly defined. Passing over the details of these investigations for the sake of brevity, the efforts now being made will alone be discussed. There are but two methods of control which, from our present knowledge of the

contagious diseases of swine, appear to promise adequate results. One is the old stamping-out method, the slaughter of diseased and exposed animals, the quarantine of infected farms, the regulation of transportation, and the disinfection of stock cars, stock pens, infected farms, and all other places harboring the contagion. The other is the treatment of diseased and exposed animals with antitoxic serum. Both of these methods have been tried to a limited extent during the past year.

The stamping-out method is attended by many difficulties and limitations. Farmers often object to the slaughter of exposed animals which are still healthy, unless paid more than the animals are worth, and they are unwilling to have their breeding stock killed so long as there is a chance of saving a part of it. On the other hand, it is embarrassing, if not impossible, for Government officials to utilize in any way the carcasses of exposed animals which have not yet developed symptoms of disease, and to destroy these adds largely to the expense. Again, it is next to impossible to control transportation and the disinfection of cars so as to prevent constant reinfection. The disinfection of farms is also a troublesome matter, as the germ of hog cholera has great vitality, and is able to maintain its existence and virulence in the soil, in moist organic matter, and even in water, for several months. Finally, the wide distribution of the disease, the ease with which the contagion is carried, the numerous agencies which contribute to its spread, are all elements which increase the gravity of the problem and militate against the success of the stamping-out method.

The use of antitoxic serum appears at present to be a much more promising method of diminishing the losses, and it is possible that it may be combined with sanitary regulations, such as quarantine of infected herds, disinfection of premises, and supervision of transportation, so as to give the advantages of the stamping-out method while avoiding many of its embarrassments. The most important point is, of course, to secure a serum with a high protective and curative power. This is by no means an easy task. The products of the hog cholera germ are very irritating, and when injected into the tissues their tendency is to cause paralysis and death of the part, with the formation of large abscesses. The intense local action hinders the absorption of the cultures into the general circulation and prevents the animal from acquiring immunity. It is doubtless for this reason that the inoculation of swine has generally failed to give the necessary degree of protection and that inoculated swine are found to contract cholera when they are afterwards exposed.

The serum produced in 1897, when used in affected herds, saved over 80 per cent of the animals. During the past few months the methods have been considerably improved, and it appears probable that a serum of higher efficiency will be the result. There is no danger connected with the use of this serum, as it is absolutely free from the germs of the disease. It is easily applied, and the good effects in sick hogs are seen almost immediately. There is every reason to believe, therefore, that we have in this serum a practicable method of preventing the greater part of the losses from hog cholera, but it must be tested upon a larger scale before absolute assurance can be given. It is hoped that all doubts may be cleared up by the experiments planned for 1898.—Fourteenth Annual Report of Bureau of Animal Industry.

HOG CHOLERA.

By Prof. W. B. Niles.

SO much has been said and written on this subject that anything more may to some seem superfluous, but as long as this disease continues to cause such extensive losses in the swine growing states, without effective means of control, an intelligent discussion of this subject is in order at all times. In this brief article, I will discuss the subject under the following heads: 1. Nature of the disease. 2. Causes and how communicated. 3. Some popular theories. 4. Means of control.

1. Nature of the disease. It has been definitely determined that there are two widespread diseases of swine—hog cholera and swine plague, but they are so frequently associated in the same herd that they may be described together, under the term hog cholera. This is known to all swine breeders as a widespread affection that ravages their herds, usually in late summer and fall, and then gradually dies out in the neighborhood until the succeeding season, when it may appear again in the same or adjoining neighborhoods. By all, it is recognized as a highly fatal trouble, from which few recover and which few fail to contract when exposed.

In virulent outbreaks, by far the greater number are of this kind, not more than one-fourth to one-fifth of the herds survive. So similar is the disease to typhoid fever in man, that many observers have thought the two affections identical. In the most typical outbreaks of the disease, the symptoms are so marked and indicate so plainly the nature of the trouble, that the diagnosis is easy. The drooping ears, failure of appetite, gaunt ap-

pearance, unsteady gait, redness of the skin under the abdomen and between the legs, with diarrhoea, can indicate nothing but cholera; but very frequently the most characteristic symptoms are absent. The disease, so mild at first that the experienced observer may not even suspect cholera. I wish to emphasize the fact that one herd may present entirely different symptoms from another herd having the same disease. The presence of swine plague complicates matters somewhat, but even in a purely cholera outbreak there is much variance in symptoms. Sometimes there is diarrhoea and at others costiveness. Many other differences might be pointed out, but the above are sufficient to show that affected herds present very different appearances. I wish to repeat the statement that I have made before, and that is, that whenever a number of swine die in a herd and apparently the same trouble occurs on neighboring farms, that the disease is either hog cholera, swine plague, or both. As the symptoms are so misleading, an examination of one or more that have died should be made. In hog cholera small ulcers will be found on the mucous membrane of the calcum—first part of the large gut near the entrance of the small intestine into it. If the animal has been sick several days these will show plainly. In addition, the spleen is large and kidneys covered with red spots. In swine plague, there is liquid in the chest cavity and pneumonia of one or both lungs. It is very essential that the true nature of the disease be recognized early.

CAUSES AND HOW COMMUNICATED.

As is the case with other contagious diseases, hog cholera is due to the action of a specific virus. In order to start a cholera outbreak this virus must be present. No system of feeding or management will alone originate the disease.

There has been much discussion about what may be called secondary causes, such as bad sanitation, feeding too much corn, feeding new corn, the influence of breed, etc., etc. Many writers have held to the opinion that while there is such a germ as the hog cholera bacillus, that the hog must in some way be made susceptible to this germ before disease will result. They usually assert that this susceptibility is brought about by improper management, feeding, etc. While we all admit that some animals are more susceptible to disease than others, I must again assert, as I did in bulletin No. 35 of the Iowa Experiment Station, that while there are factors in operation that to a limited extent make swine more susceptible to cholera and have much to do in spreading the disease when once started in a neighborhood, none of them will cause an outbreak without the specific germ. On the other hand, the virus may be, and usually is, sufficiently

virulent to cause a fatal outbreak in the most vigorous and well kept herd. Repeated observations more firmly convince the writer that predisposing or secondary causes are seldom if ever important in starting cholera outbreaks. When, however, the disease has appeared, careless feeding, bad sanitation, etc., will increase the ravages in the herd.

A careful study of the different sources of infection shows that the disease is communicated in a large per cent of outbreaks by a diseased hog. In the careless purchase of swine an actually diseased or exposed animal is secured along with the rest, and an outbreak results. Pigs from a diseased herd wander to the neighbors, and in this way the disease often extends over a neighborhood. The practice of allowing hogs to run at large is accountable for the spread of the disease in many sections. Dogs feeding on carcasses that have not been disposed of may convey the disease to other farms; and the same may be said of carrion birds. Men, wagons and teams in going from infected pens into yards containing healthy herds may also convey the disease. Streams of water passing through infected yards and pastures may and frequently do convey the disease to herds along the stream below. Other sources might be mentioned.

Dr. Bitting, of the Indiana Experiment Station, has given much prominence to streams of water as conveyers of the disease. It is true that diseases may be extended in this way, but streams of water are not necessary for the spread of the disease. My observation has shown that the disease may extend across a township by simply extending along the highway from farm to farm. I have in mind several neighborhoods where the disease has extended along the public road from farm to farm without the farms on parallel roads one mile away becoming involved. This shows that the germ is carried along the lines of traffic either by the diseased hogs or by men and animals passing from farm to farm. It is very evident then that the disease being due to a specific virus is communicated by this virus being carried from place to place in the ways referred to.

SOME POPULAR THEORIES.

A veteran swine breeder said to me the other day, "Advance any theory and all will cite facts in opposition to it." This remark shows that he knows much more about cholera than many who have written concerning it.

The theory that the disease ravages the herds of the corn-growing states because too much corn is fed is not correct, as a careful study of the facts in the case will show. The theory that feeding new corn causes the disease has no facts to support it, and is in no sense true. The theories that breed has

much to do with the prevalence of swine diseases has also been proven incorrect, as has the one that bad sanitation may start an outbreak. In short, any theory inconsistent with the facts set forth above is incorrect, and a discussion of it only leads to confusion.

Any stock-owner who works on any other theory than that the disease is due to a specific virus which is in some way conveyed from herd to herd and who would endeavor to protect his herd in any other way than by excluding this specific germ, makes a fatal error.

MEANS OF CONTROL.

A consideration of what has gone before leads up to the question. How can the disease be controlled? How can these extensive losses be prevented? Treatment of the sick or of the entire herd after the disease appears, has so far been unsuccessful. It is true that very many preparations are advertised as cure-alls, but not one of these has stood a careful test. This failure to check the disease by means of medicines is now more generally recognized than heretofore; the hopelessness of treatment I believe has become generally recognized.

It does not seem reasonable to the writer to suppose that any preparation can cure a hog badly diseased with cholera or swine plague. Typhoid fever is incurable in its virulent form, and all know of the fatalities in our large army camps during the summer of 1898.

So far, no medicine has been found that will render swine immune against cholera. Failing to cure the sick, or render the well immune against the cholera germ, it is then evident that the herd must be kept from being exposed. With our present laws and regulations this is not easy. Without the aid of sanitary regulations strictly enforced by the state or general government the individual owner can only to a limited extent protect his herd. Of course by isolating it from all others and using the utmost care to prevent communication with diseased herds, he may escape a visitation of cholera. There is much to be said in favor of government or state control of cholera by means of quarantine of infected herds and premises. For example, in spring and early summer there are but few cholera centers in a given county. In a county where I have recently made some observations, there was in the spring not more than a half-dozen farms in different parts of the county where cholera existed. A rigid quarantine of these farms would certainly have prevented the widespread outbreaks that came from the primary centers. Just as long, however, as free communication is allowed between infected and uninfected herds and the owner has

to rely on his own efforts, the disease will extend over the county from the primary centers.

The state of Minnesota is attempting state control with seemingly good results. Recently the serum treatment as applied to some other diseases has been tried in connection with hog cholera, and this season the Bureau of Animal Industry is making a careful study of this method. Dr. Peters of the Nebraska Experiment Station is also working along this line. So far, the results have been promising, but it is yet too early to determine the value of this treatment. If the use of the serum will cure the mild cases, or even render those unaffected proof against the disease, it will very greatly assist in controlling the disease. Should the serum treatment come up to expectations, its use in connection with quarantine measures would enable us, in the opinion of the writer, to effectually control this very widespread and fatal disease of swine. Granting that we will come into possession of a specific remedy, I consider the quarantine measures will still be needed, for it is certainly easier to nip the disease in the bud where it breaks out than to treat all the hogs in a district.

Until some systematic method for dealing with this disease is inaugurated, the problem will continue to vex us.

Ames, Iowa.

FOURTEEN YEARS' EXPERIENCE WITH HOG CHOLERA.

By Will Manning.

MOST farmers, like business men, are selfish and keep trade secrets. What is really required among farmers is more harmony, confidence in one another, and willingness to help the under dog in the fight for bread.

In the year 1884 I was feeding one hundred head of hogs, besides fifty stock hogs. Just before oat harvest, the stock hogs got in the oat field. They were driven out, but with a great deal of trouble. Some of the hogs were overheated and laid down in a pond, where some of them died and were left unburied. Buzzards were attracted. Within ten days I had the first case of hog cholera in the county.

I was away when this happened; on arriving home, found sixteen dead hogs, all stockers. The balance of the herd were nearly all sick, including those that I was feeding.

I had to save the hogs or break up. "A drowning man will catch at a straw," and having followed the old saw, "a stitch

in time saves nine," I had procured a hog cholera receipt, not expecting ever to have the disease on the farm.

I had a hog hospital and worked day and night. Did not lose another hog in the lot. Cured hogs that were so bad that they could neither kick nor squeal. As the disease was new at that time, the neighbors gathered in to see me "cure dead hogs." From that day to this, have never lost a hog with cholera, but have never as yet, with the exception of a few cases, tried outside of my own hogs.

My great aim has been to find out what hog cholera is, its cause and cure. As yet, have never found anyone that agreed with me, but can prove that my theory is correct and stands to reason. Typhoid fever in the human family and hog cholera are one and the same diseases, but hogs have the disease in a more violent form. Have known cats to die with it, and studied the progress of the disease in them until dead. Chicken cholera is one and the same disease. Rats have it, but not in a violent form.

Through the last source the disease breaks out in unexpected places, as the rats will leave the germs of disease in the corn:—the good wife feeds this corn to her chickens; the farmer starts his hogs on the old corn. As before stated, typhoid fever and hog cholera are the same. Have known the fever to go through an entire family; anyone visiting them during such sickness will carry the disease in their clothes; now let them go among a lot of hogs, the chances are ten to one the cholera will break out in that drove, as the hog is more susceptible to the disease than any other creature. If a man is in perfect health, he will throw off the disease; not so with the hog. The first great essential thing is cleanliness in the hog, as well as in the human family. Take a hog with typhoid fever, as I call it, and treat him the same as you would father, mother, sister or brother for the same disease, and the chances are that he will get well. As this is impossible, a different course is determined on.

As the old adage says, "An ounce of prevention is better than a pound of cure."

In cases of typhoid fever, bury all excrement from patient, kill and cremate all sick cats, rats and chickens. If you start to feed old corn to hogs, soak the corn in a solution of copperas water. Let the hogs have free access to charcoal—by so doing you will save one-fourth of your corn.

The cure for hog cholera.—2 pounds copperas; 2 pounds sulphur; 5 pounds charcoal; 4 ounces gentian; 4 ounces black antimony. Powdered and mixed.

Dose.—Tablespoonful three times a day in slop or ground feed as a preventive.

If too sick to eat, throw hog on back, put a strap around under jaw, with spoon put medicine down throat. Will warrant this, if properly done, to cure eight out of ten sick hogs.

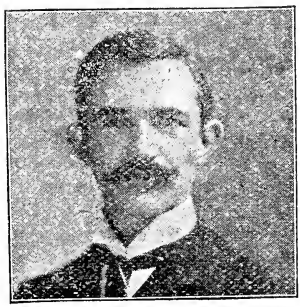
If sow is with pig, the chances are that she will die. If she does not, she will lose her pigs, and will be of no value as a brood sow afterwards. The successful business man guards against every contingency, so must the farmer watch every nook and corner and trust the Lord for the increase.

Indiana.

WHAT WE HAVE LEARNED ABOUT HOG CHOLERA.

By Prof. A. W. Bitting.

THE contagious diseases of swine, hog cholera and swine plague, were exhaustively studied a few years ago. The Bureau of Animal Industry, one or two of the experiment stations, notably Nebraska, and a few individuals made extensive researches upon these diseases. No time or expense was spared, and some of the best pathologists in the country contributed their skill in the study.



PROF. A. W. BITTING.

The germs of hog cholera and swine plague were discovered and studied under all conditions, how they are distributed, how they find their way into the body, what effect they have upon the animal, the symptoms produced and the postmortem appearance. In fact, everything pertaining to the cause of the disease and the appearance of the diseases were carefully worked out and fully described. All the work that has been done since has added but little new information. The whole story of the work and how it was conducted is to be found in two most interesting reports from the Bureau of Animal Industry. The story has been repeated so often in the newspapers that it will not be repeated here.

The work at that time gave no remedy which would cure the disease, and the recommendations for prevention, while theoretically correct, if all the facts as to the cause are known, are

impractical in application. What we have learned recently in treatment or prevention has added very little of any consequence.

From a practical standpoint we are little better off now than before the studies were made. I do not mean to underestimate the work that has been done. It is of the greatest importance to us. It is essential that we know the cause and effect of a disease if we are to employ rational methods for prevention and treatment. That which has been done is the foundation for future work. What I do mean to say is, that if the losses in the United States aggregated $50,000,000 in 1890 and the same conditions existed for causing a similar loss in 1898, we could not materially decrease that loss.

One of the failings among scientists is that they become intensely interested in the cause of a disease and its effects upon the body, but apparently care little about the prevention or treatment. They are willing to study the germ under every conceivable condition, the products which it forms, how it acts upon the body, the symptoms of the disease and how to make a positive diagnosis, and are then willing to stop. That seems to be the condition in regard to this disease. What is needed now is an expenditure of an equal amount of energy and funds in a study of practical method of control and treatment as was used in the study of the cause and pathology. Such a study may give us means of relief or give us the reason why nothing can be done. Much has already been done, but not enough.

We advise sanitary measures as a prevention of the diseases. This is undoubtedly the best advice that can be given at present, but is much easier said than done. If all were to adopt such measures, undoubtedly there would be a decrease in disease, but it is visionary to suppose that a strict enforcement of sanitary regulations can be carried out over such a wide area of territory as is covered by these diseases. The application of sanitary principles to herd management is the best preventive the individual can use, but everyone with experience knows that the disease often breaks out on farms where the conditions could not be improved and under circumstances that lead us to suspect that there are factors in the distribution of the disease which we know nothing about.

There is a strong clamor for state police control over these diseases. To what extent such control could be exercised is not by any means a settled question. The government has made one small attempt at police control in Page county, Iowa. Some

unofficial announcements have been made that the results more than justify the expenditure. Plainly stated, the experiment was too small and conducted for too short a time to warrant drawing any conclusion. Such an experiment should be carried over a period of at least four or five years before a conclusion is reached. Minnesota has made a systematic effort to limit the spread of the disease, and seems to have met with a fair degree of success, but her problem is very different from that in Indiana, Illinois and Iowa. Her experience is of short duration, and can not be regarded as having much significance in what might be accomplished in other states. England has been making an attempt to stamp out the disease. But with all the inspection she has exercised this year the disease is making an increase in the number of outbreaks and the number of hogs attacked over that of last year.

Even in such a fundamental matter as the transportation there is not an agreement of opinion as to what should be done. Theoretically, no diseased or exposed hogs should be transported, because of the danger in disseminating the disease. Practically, we find that the shipping of hogs from central stock yards to the country for feeding purposes is almost universally attended with great loss and a dissemination of the disease and should be stopped. If, however, the transportation of hogs from a cholera infected region were prohibited, it would mean the loss of large numbers of hogs and prolong the period of infection. How much infection is spread by transportation companies other than the delivery of hogs for feeding purposes is not known. I am inclined to think that it is greatly overestimated. After five years' inquiry, I have been unable to find more cholera along the lines of railroad than at a distance of two miles.

When everything is summed up, we have nothing to guide us as to the extent to which state control can be economically applied.

Inoculatoin for the prevention of the disease was extensively tried and failed. Now a serum treatment is being tried, and the preliminary experiments have proved successful. What the result will be at the close of this year's experiments can not be foretold. If it should prove a success, it will not have the practical value that many expect. The serum is obtained by the inoculation of horses or other animals, and producing immunity. When they have become immune, they are bled and the clear part of the blood is used for the treatment of the hog. Necessarily the product is limited.

In 1896 Indiana lost 900,000 hogs from disease. It would have required 450 barrels of serum to have inoculated that number and 1,400 barrels to have inoculated all in the state. The limited product, the skill required in its manufacture and use will limit the use of serum. It is likely to prove one of those beautiful scientific discoveries of comparatively little practical value.

We have no treatment to recommend. No specific has been found, but there is a feeling that not enough experimenting has been done along that line. During the season of 1897-'98 I tested 141 so-called cures, using 4,300 pounds of the different preparations. They were not as successful in my hands as in the hands of the originators, but the fact that we have so many upon the market is evidence that they do some good and are in demand. The matter is worthy a more thorough trial than it was possible to make in one season.

To summarize: We know a great deal about the cause and appearances of swine diseases.

We know little about its prevention and less about it treatment.

We can recommend cleanliness.

We can further recommend that farmers persist in their demands that more study be given to means of prevention and treatment.

Purdue University.

PROF. THOS. SHAW.

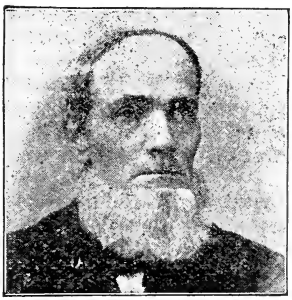
PROF. C. S. PLUMB.

TWENTY YEARS WITH HOG CHOLERA.

By James Riley.

I HAVE been breeding swine for thirty-eight years and have been a regular exhibitor of Berkshire swine for state and county fairs for the past twenty years, and in that time have had a great deal of experience with hog cholera. The breeder and exhibitor is more exposed to the dread disease than the farmer, as it is so difficult to make the fair circuit without exposure to the disease.

The farmer and breeder should be constantly on guard and at the first appearance of this disease, should immediately begin vigorous measures to stamp it out. I have learned by experience that there is more in prevention than in cure. So let us discuss the best preventive measures.



JAMES RILEY.

First, the hogs should be given the best sanitary treatment possible. They should not be allowed to sleep at old straw stacks, but should be provided with clean, dry beds, they should have free access to pure water and not be allowed to drink from stagnant pools. I would recommend the Wilson automatic stock fountain or some other good automatic fountain that will provide pure, fresh water for the hogs at all times. The next important thing is the diet. Hogs should not be fed corn or any other kind of feed exclusively, but should have a variety of food. They should have plenty of grass, rye or some other kind of green food. With plenty of exercise the feed should consist of shorts and bran or ground oats and corn mixed, or ground rye or barley with some corn. The hogs should have free access at all times to wood ashes and salt. Mix good wood ashes and salt in proportions of three-fourths ashes to one-fourth salt, and keep in a shallow box in order to give the hogs free access to it at all times.

It is very important to keep the sleeping quarters and lots where the animals are fed thoroughly disinfected. There are a great many good disinfectants, but we use chloro-naptholeum and lime. We use several barrels of lime per year and use our chloro-naptholeum diluted, 40 to 50 parts of water to 1 of chloro-naptholeum. We take a large candy bucketful of the solution and

thoroughly sprinkle or spray the animals and the floor of the feeding pen. The feeding trough should be disinfected and the slop barrel washed out once a week with the disinfectant.

The hogs should not be allowed to become lousy. To kill lice on hogs that are gentle and easily handled, take a half-and-half mixture of lard and chloro-naptholeum and grease the hogs all over their bodies and inside their ears. This kills the lice and disinfects the skin as well. If the hogs are wild and difficult to handle, sprinkle or spray them with a solution of ten to twenty parts water to one of the chloro. This frees the animals from lice and all skin diseases and keeps them healthy and vigorous so that if cholera strikes the herd they will have a hardy constitution to resist it. A larger per cent will pull through and recover; whereas if the vitality of the herd was in a low condition almost the entire herd would be destroyed.

If cholera does invade your herd, don't wait to experiment with "sure cures," but at once remove all healthy hogs to new quarters after having thoroughly sprinkled them with the disinfectant. Then, confine the sick to warm, dry quarters, and disinfect them all over every day.

It is easy to kill the cholera germ externally with disinfectants, but very difficult to kill them internally with drugs. The cholera germ will not live ten seconds in slacked lime and the chloro-naphtholeum solution will kill every germ it touches.

The shoes and clothing of the attendant on the sick hogs should be disinfected and all measures taken to stamp out the disease from the start and not allow it to spread in the herd. If the sick hog dies burn it at once, instead of burying it, as burning destroys the germs entirely, while burying preserves them in the ground and they are liable to be dug out by dogs or hogs and scattered over the farm.

If all the farmers and breeders in the country would adopt the method I have here given I know from personal experience that hog cholera and swine plague would be controlled and even eradicated, but one careless farmer can scatter the disease throughout his neighborhood.

Indiana.

—The brood sows should have a run on pasture of some kind. Clover, alfalfa, rye and oats are good. They should have plenty of pure water at all times. I consider the water fountain the best way to supply them with clean, pure water. I consider oats with a slop made of one-third shorts and two-thirds wheat bran fed twice a day the best ration for brood sows.—W. P. Winner, Kansas.

WORMS—INTERNAL PARASITES OF THE PIG.

By D. McIntosh, V. S. Professor of Veterinary Science in the University of Illinois.

THE parasites of the pig are so intimately connected with those of the human being that there is no doubt but that in certain stages of their development nearly all the most dangerous kinds are derived, either directly or indirectly, from the hog to mankind, and in return man furnishes to the hog the eggs of several of their worst parasites. Some of these worms are kept in existence solely by reason of the peculiar relations existing between man and the domestic animals.

PROF. D. McINTOSH.

Worms, sometimes on account of the movements and the interruption they offer to the contents of the bowels, and their other modes of irritation, very often cause uneasiness and pain. From sympathy there is very frequent sensation of itching at the anus and nose, producing a disposition to scratch or rub the root of the tail and poke the nose into the ground. This is a very common symptom of worms. The bowels are constipated at times and at others relaxed with mucous or blood discharges; the mucous which is passed may be in shreds, which are sometimes mistaken for fragments of half digested worms. They also interfere with digestion, both of the stomach and intestines, which is indicated by undigested food in the feces. The appetite is very variable, it may be natural in some cases, and in others deficient, depraved or craving, usually the animal has a ravenous appetite, eating material which it would not touch in health. Bleeding from the nose, cough and swelling of the lips are also symptoms. The effects of worms frequently extend beyond the alimentary canal. Among the most common of these affections are derangement of the nervous system, such as vertigo, chorea and fits, obstinate cough, swelling of glottis, dyspepsia and palpitation. They also cause some fever and loss of flesh and several skin diseases. It is difficult to diagnose a case of worms, as the above symptoms may be caused from indigestion. A new means of detecting them is by the microscope; even if there are no fragments of the worms present in the feces their eggs can

be detected. Suspected cases ought to be examined by the microscope, and if the examiner is acquainted with the character of the ova this will decide the case.

Causes of worms: There has been a great controversy on this subject, but no doubt the parasites obey the general law of nature in their development and growth. It is probable that the ova which are received into the alimentary canal are capable of development in a healthy state of this structure, as worms are sometimes found in the stomach and intestines of a hog in perfect health. There are certain conditions of these organs which are favorable for the breeding of worms, such as indigestion, the accumulation of undigested food and of mucus and diseases of the intestine. The kind of food the animal eats in a raw condition containing the ova of worms makes the pig more liable to worms than other animals. All kinds of vegetable and animal food should be cooked; grains can be eaten raw with impunity; hogs should not be allowed to eat diseased meats unless it has been thoroughly cooked. I have known healthy pigs which were given the flesh of animals that died from disease to become badly affected with worms.

THORN-HEADED WORM.

This worm is quite frequently found in the intestines of pigs; it is easily known by the peculiar proboscis which bears several circles of small but sharp hooks. They locate usually in the small intestines of the pig, where they fasten themselves by means of the spiny proboscis mentioned above, this being pushed into the lining membrances of the intestine; in some cases they bore through this and migrate to other parts of the body, where their presence causes great disturbance. The eggs of this worm pass from the hog and are eaten by the grubs of certain large beetles; in the stomach of these grubs the eggs develop into embryos, or rather the embryos already developed are set free and bore through the intestine and locate themselves in the body of the grub. Here they become encysted and remain dormant until the grub is eaten by the pig and then once in the stomach or intestine of this animal it develops into a worm at once. The color of this worm is white or bluish white, the female being from five to twenty inches in length, while the male is from three to five inches long. The female is very prolific, producing immense numbers of eggs, which are of a somewhat oblong-oval shape.

Symptoms: Pigs may have a number of these worms without their causing any noticeable derangement; on the other hand, they often derange the digestion and assimilation, causing

loss of flesh, and a general unhealthy appearance. The animal is usually hungry and may eat large quantities of food and yet remain thin. When a pig has such symptoms with the absence of any other ailment we may suspect that worms are the cause. In very bad cases the pig becomes weak in the loins and the membrane in the corners of the eyes swollen, red and watery; the animal suffers pain, which is indicated by it continually grunting or squealing; such hogs are usually bad tempered and will bite and snarl at the other pigs. In some cases the weakness increases and the animal is unable to stand and soon dies.

Treatment: This worm is easily removed by medicine. I have had good results from the following: Give half an ounce of the fluid extract of spigelia and senna at a dose every four hours until purging takes place, or thirty grains of koosin as a pill, one dose of this is usually sufficient. Another good remedy is to beat up two ounces of pumpkin seeds into a pulp with sugar and give at one dose; this should be followed in four hours with a brisk physic, castor oil or epsom salts. Santonine is also useful in from three to five grain doses made into a pill. Chenopodie oleum (worm seed oil) in from twenty to thirty drops may be given in a little syrup, followed in two hours by a purge. These medicines should be given on an empty stomach. If the animal has become very weak the strength should be kept up by stimulants, such as small doses of whisky and cod-liver oil, or whisky and eggs, and if there is fever, two to four grains of quinine should be given at a dose three times a day.

OXURIS VERMICULARIS (PIN WORM.)

The seat of this worm is the rectum, but they are sometimes found in the colon, and have been seen in the stomach; on this account they have been called the maw worm. They are usually about half an inch long and white in color; they multiply very rapidly; their eggs are very small, and are often deposited on the grass, and may be washed into the streams or ponds of water and in this way enter the stomach and bowels. They are found in all the higher animals.

Symptoms: They usually cause itching at the root of the tail or by reflex action cause derangement of other parts of the body. Though productive of great annoyance and even suffering, they do not usually injure the health of the animal.

Treatment: Clean out the rectum by injections of warm water. Infuse two ounces of quassia chips in a pint of boiling water, and when cool inject it into the rectum; repeat in a week if necessary. A brisk purge will often wash out a number of them.

TRECOCEPHALUS DISPAR (LONG THREAD WORM.)

This worm is found most frequently in some part of the colon and cecum, but sometimes in the small intestines, either loose or with its anterior capillary portion inserted in the mucous membrane. It is often observed in great numbers in animals that have died from some acute disease. I have found numbers of these worms partially buried in the mucous membrane, but they did not seem to have caused much disturbance. They are about half an inch to one inch and a half long and about as thick as a common thread, and are very active in their motion. From experiments that have been made, it appears that the ova are never developed in the animal body, but being discharged with the feces retain their vitality a long time, and if placed in water become at the end of about eight months and a half developed into embryos, about one three-hundredth of an inch in length. It is probable that these are carried by the rain and other means into streams, wells, etc., where the drinking water is derived and thus become fully developed. There are no particular symptoms by which we can detect this worm from others during the life of the animal, and the treatment would be the same as for the thorn-headed worm. Very often when worm medicine is given a variety of worms will be discharged at the same time.

ASCARIS SUILLA (ROUND WORM.)

This is a round, smooth worm of considerable size; the male usually reaches, when fully developed, six inches, and the female may be twice that length. This worm usually does no harm when there are only a few present. The animal will likely keep in good health, but when they are numerous they will disturb digestion and cause colicky pains, loss of flesh, dry hair, morbid appetite, restlessness and nervous twitching, and in some cases fits. Cases are recorded in which they worked through the walls of the intestines and, reaching some of the other organs of the body, caused death. This worm generally inhabits the small intestine, but not infrequently finds its way forward to the stomach or backwards to the rectum, and sometimes escapes from the intestine through the anus. This worm has also been found in the biliary duct, gall, bladder and the substance of the liver. There has been a number of experiments made to find the origin of this worm, and it is found that the eggs of this worm are passed from the bowels. They retain their vitality for a long time, they appear never to be developed in the bowels, but when discharged and kept in water they begin to show signs of

life and in about seven months contain embryo worms one one-hundred and twentieth of an inch in length. These have not been seen to break shell, but the ova carried into streams, ponds and wells sometimes probably find an entrance into the stomach with the drinking water, when the embryo escapes from its shell and completes its growth in the intestine.

Treatment: The best remedy for this worm is the fluid extract of spigelia and senna given in half ounce doses every four hours until it causes purging. Worm seed oil (chenopodium) in doses of from five to ten drops given in a tablespoonful of castor oil is also good. Turpentine in doses of from fifteen to twenty drops three times a day for two days followed by castor oil or epsom salts, is useful. The cedar apple, an excrescence found on the red cedar, has been used with good results in doses of from twenty to twenty-five grains of the powder, repeated three times a day, followed by a physic.

SPIROPTERA STRONGYLINE—RUD.

There are a number of small, whitish or reddish round worms which taper somewhat towards the anterior end, or towards both ends. The head is small, with small papillae or naked; the male grows to about half an inch long or more; the female one-third of an inch or more; it lives in the stomach of the pig, but generally does not produce any serious disease. The fluid extract of spigelia and senna in half ounce doses, given every four hours, until purging ensues, usually dislodges them.

SCLEROSTOTUM DENTATUM DIESING.

This is a small worm living in the intestines of swine. The male is about one-third of an inch long; the female is half an inch long; the body is of a dark color and the surface is finely marked with transverse striae. It is quite slender and tapering at each end, but the male has near the tail a three-lobed expansion. The eggs are laid in the intestines, from which they pass into the open air and are soon hatched. The mouth of this worm is circular and armed with six teeth, by means of which it attaches itself to the intestines and pierces the tissue, feeding upon the blood. If there are many of them they create such a drain on the system of their host as to weaken and possibly destroy it. It may also by its irritation of the bowels cause serious trouble and disease. An active purging is the best remedy for the removal of this worm.

STRONGYLUS DENTATUS (RUD.)

This worm is found in the intestine of the hog. It is a slender

filiform worm about half an inch long; the head is obtuse and surrounded by six acute papillae; the oesophagus is short, thick and muscular; in the male the tail is truncated and provided with an oblique bursa; in the female it is elongated and slender, ending in a fine point; the genital opening is near the posterior end. The history of this worm is not known. It does not seem to do much harm. The usual treatment for worms is nearly always effectual in bringing them away. I have seen quite a number of them mixed with other worms in the feces of a hog that had been treated for worms.

STRONGYLUS ELONGATUS.

This species live in the lung and air passages of the pig. This worm is about one to one and one-half inches long. They often occur singly or several together. When they are numerous they set up great disturbance, often resulting in the death of the host. The first symptom of the disease is a cough, usually slight at first, but soon becoming very distressing, and the pig shows signs of suffocation, which sometimes takes place, or inflammation may set in and carry off the animal. This disease is often taken for catarrh or some other respiratory trouble, and it is very difficult to diagnose unless a worm which has been coughed up may be seen protruding from the nose.

Treatment: This is not easy in the pig. Small quantities of turpentine injected into the nostrils may reach the worms. Turpentine given in teaspoonful doses three times daily for two days, will sometimes be of use, as the turpentine is partly eliminated by the lungs. The inhalation of the fumes of carbolic acid is also useful.

KIDNEY WORM (EUSTRONGYLUS GIGAS.)

This worm is found in the kidneys of all the domestic animals and in man, although it is very rare. It is a large worm and it is said that sometimes the female becomes three feet long and half an inch in diameter, although usually much less. The male becomes ten to twelve inches long. I have never seen any of them so long, as they are usually only a few inches long. The body is smooth, round and tapering somewhat to each end, and of a deep red color. When such worms are present in the kidneys they gradually, but completely, destroy the substance of the kidney which becomes filled with purulent matter, upon which the worm feeds, while the walls often become hardened with calcarous deposits. The effects and symptoms are the same as in other acute diseases or abcesses in one of the kidneys. The only positive proof of the presence of the worm would be the

discovery of the eggs in the urine. It is probable that no remedy can be applied when the parasite is once lodged in the kidney. The history of this worm is not fully known (Werrill.)

I have found live worms in the kidneys of both the pig and dog and the kidneys were perfectly healthy and neither animal seemed to be in any way affected by them. The loss of power of the hind parts of pigs, which has been attributed to kidney worms, is not due to a parasite, but to paralysis of the muscles of the hind parts. I have made careful investigations of such cases, but failed to find any worms or any disease of the kidneys. Paralysis of the hind parts would not be the symptom of kidney disease.

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